SCIENCE & DIPLOMACY

A quarterly publication from the AAAS Center for Science Diplomacy

Jan-Stefan Fritz"Observations, Diplomacy, and the Future of Ocean Governance," *Science & Diplomacy*, Vol. 5, No. 4 (December 2016). http://www.sciencediplomacy.org/article/2016/observations-diplomacy-and-future-ocean-governance

Observations, Diplomacy, and the Future of Ocean Governance

Jan-Stefan Fritz

"We know less about the ocean's bottom than about the Moon's back side."

—Attributed to Roger Revelle, a University of California, San Diego, scientist who was a pioneer in the study of global warming

Since the 1950s, scientists have begun countless presentations with this pithy aphorism in order to impress on audiences the neglected importance of ocean science. Recently, it has been used with particular frequency to advocate more detailed and systematic collection of data and information about the oceans.2 Proponents argue that sustained ocean observation should complement traditional ocean research, much as satellite applications complement human spaceflights, to deliver the best scientific data and knowledge for policy making. Enlisted in this task are infrastructures known as ocean observatories, which collect data and information usually for scientific (e.g., to understand ocean dynamics) or operational (e.g., for shipping or weather forecasting) purposes. While a number of ocean observation systems exist, the budgetary and institutional requirements of collecting data from remote and hostile sites on Earth is so high that most of these operate on politically and financially modest or uncertain foundations. This may be about to change. To the surprise of many observers, in 2015 the leaders of

---

Lisa M. Frehill is an organizational evaluation & assessment researcher at the U.S. National Science Foundation and director of analytics at the Energetics Technology Center.

Katie Seely-Gant is an analyst at the Energetics Technology Center.

the G7 industrialized states agreed on a declaration that specifically highlights the importance of ocean science. In 2016, their science ministers agreed to support an ocean observation initiative as a means of providing scientific evidence for more appropriate policy making.

Given unprecedented international political interest in their work, members of the marine scientific community are under great pressure to produce what are deemed by governments to be useful research findings. The G7 recommendation comes in a period of raised governmental and commercial interest in the oceans and increasing reports of a decline in their environmental quality. Whereas the strains in international relations are often highlighted in public, for example conflicts over various regional seas, the international community has simultaneously taken positive steps, such as agreeing to discuss strengthening environmental governance of the oceans. Marking the greatest sign of such interest is the agreement at the United Nations in 2015 to include a separate goal (no. 14) for the oceans in the Sustainable Development Goals. This goal seeks to "conserve and sustainably use the oceans, seas and marine resources for sustainable development." As an initial step toward implementing this goal, the UN General Assembly has agreed to hold a first global conference on the oceans in June 2017 in New York City. In parallel, negotiations for an agreement under the UN Convention on the Law of the Sea concerning the use of marine biological resources and separate negotiations on the exploitation rules for deep-sea minerals are under way. Ocean science is identified as a key area of focus in all of these negotiations.

Against this background, the time seems right to launch a global science-based effort to collect data and information about the state of the oceans. In fact, a 2010 report by the Royal Society and American Association for the Advancement of Science argued that "international spaces beyond national jurisdictions—including Antarctica, the high seas, the deep sea and outer space—cannot be managed through conventional models of governance and diplomacy, and will require flexible approaches to international cooperation, informed by scientific evidence and underpinned by practical scientific partnerships."3 If a global ocean observation initiative is to successfully deliver on such an expectation, a bridge must be built between the science-based partnership and the intergovernmental process.

This article explores the current G7 proposal for a global ocean observing initiative and the challenges and opportunities that may arise from vis-à-vis interstate competition and cooperation. Given that states use data and information from the oceans to compete as well as cooperate, the article argues that science diplomacy is a useful conceptual tool to reflect on and shape relations between scientific and policy communities. It concludes that the proposed global ocean observing initiative is a valuable test case for the role of science in shaping interstate relations in their governing of ocean spaces beyond national jurisdiction.

A Time of Great Expectations

A couple of the interviewees were cognizant of personnel at consulates and embassies who were involved with promoting trade and cultural exchange. Interviewees recommended these embassy personnel to the interviewers as sources of information to assist with scientific exchanges and collaborations. In other cases, in the course of their interviews, interviewees deployed terminology typically associated with diplomacy. When asked about possible disparate treatment due to their own ethnic background or gender, three interviewees with extensive international experience referenced a need to be a "citizen of the world." This phrase has come to be used to indicate adoption of a global rather than national identity, to signify a sense of being comfortable in any country. On a related note, another scientist indicated that her university had established a database of faculty who had international experience and referred to these faculty members as "ambassadors" who could provide guidance to other faculty traveling to the same countries.

The use of diplomatic language in a conceptualization of science for diplomacy was reflected in the comments of another interviewee, who had experience in China and several other Asian countries. This respondent was asked whether the NSF should provide support for international collaborations. She emphasized the importance of strategic reasons in saying, "I'm not sure they [researchers] should have funding just for international because it's international unless there's some strategic reason for the U.S. to want to make closer scientific ties with a particular country." The interviewee's emphasis on strategic reasons as justifying public expenditures explicitly acknowledges the diplomatic goals of international collaborations from a U.S. perspective, while complementing the diplomatic language of viewing scientists as "ambassadors" and "citizens of the world." This suggests institutions may want to deploy the language of diplomacy to prepare researchers with international collaborations to be mindful of science for diplomacy. Furthermore, institutions need to recognize the conceptualization of identity in terms of researchers' attachment to the United States in order for researchers to be conscious of their role as representatives of the United States versus the global identity implied by the term "citizen of the world."

Bridging the Science-Policy Gap

An important task in 2016–2017 will be to manage the great expectations of ocean observing by defining the relationship between science and policy. During this period, various proposals will presumably begin to shape the international ocean observatory initiative. While speculating about the final form of an initiative is futile at this stage, it is entirely worthwhile to analyze expectations and challenges likely to be faced during implementation. Specifically, the proposed initiative is

expected to bridge everything from collecting data about the state of the oceans to informing what are termed "appropriate" policies.

Indeed, one of the key questions already facing the ocean observing community is what role data and knowledge ought to play in ocean governance and decisions concerning the conservation and sustainable use of ocean resources. On this count, data and knowledge about the oceans are fundamentally intertwined with the ways in which states and societies govern the global oceans. However, the role of data and knowledge has been ambiguous to date. The more humankind has learned about the oceans, the more states have entered the ocean realm to claim its space and exploit its resources. In the observation of one legal scholar, the "foundations of today's law of the sea are basically the product of often-antagonistic struggles among and between dominant human forces. These forces have produced impressive technological capabilities and made possible the modern way of life in industrialized societies, but ultimately they also seem to threaten the stable Holocene state."13

Simultaneously, increased knowledge about the impact of human actions on the oceans has led to calls to govern the ocean and to use its resources more responsibly. Much as weather data has provided the basis for sophisticated meteorological analyses and improved predictive capacities, the Intergovernmental Oceanographic Commission (IOC) sees the "scientific knowledge acquired through sustained ocean observations [being] applied through early warning for ocean-related hazards, climate forecasts and projections, ecosystem management and assessments and ocean governance."14 In line with this view, the broader scientific community engaged in ocean observations profoundly recognizes the need for societal relevance. A 2009 IOC-endorsed ocean observing community strategy paper, titled A Framework for Ocean Observing, states that global ocean observing should "address both ocean research and societal needs. These include the growing concerns of national and international decision-makers, and the public at large, regarding reliable sources of factual and unbiased information on the state of the ocean to inform needed decisions and services."15 To this end, a number of initiatives already exist addressing most of the expectations raised by the G7 science ministers.

Regarding the need for more knowledge about the insufficiently observed areas of the oceans, countless experts and observers support such an endeavor. However, given limited budgets and the logistical complexity of conducting ocean research, the marine scientific community is engaged in an almost perpetual debate as to which data should be collected in order to best characterize the oceans. Perhaps the most widely accepted list of essential data types was defined under the auspices of the Global Ocean Observing System, a mechanism cosponsored by a number of UN bodies and the International Council for Science. Referred to as Essential Ocean Variables, the list contains approximately thirty physical environmental variables for which quantitative data can be collected. While no formal agreement exists on

exactly which data types should be included on the list and which excluded, these variables can be described as sets of data needed to understand the functioning of and changes in the ocean system, including human impacts—though, to date, no socioeconomic data are included. While agreeing such a list is more or less straightforward, the practical implications of deciding which data to collect with limited funds and to ensure societal relevance will require an extensive dialogue about "which data should be collected for which purpose." While the G7 ocean observation initiative is not at a stage where decisions about such questions can be made, proponents of ocean observing can realistically expect a lively debate about which data ought to be collected and what these should indicate about the state of the oceans.

The second expectation presently being addressed involves the interrelationship between the ocean and economy, especially in light of potential changes in the ocean. In recent years, a number of high-profile reports on the ocean economy have been published by such organizations as the World Wildlife Fund (WWF) and OECD.16 Although such reports offer some broad figures on the presumed size of the ocean economy, the OECD project team, for example, encountered such a dearth of statistics on the ocean economy that they created a new OECD Ocean Economy Database for their report. Moreover, the lack of data has complicated efforts to estimate the costs and benefits to the ocean economy from investments made in ocean observing. In short, data are lacking about the oceans and how humans create value from them. Ultimately, the quandary is whether the benefits of knowing more about the oceans would outweigh the substantial costs of collecting relevant data and information.

In order to better understand the opportunity costs of investing in data collection, a joint effort is being initiated between the European-funded AtlantOS project and the OECD Future of the Ocean Economy project. AtlantOS is a pan-Atlantic research project funded largely by the European Union's 2020 program, but with contributions from Brazil, Canada, South Africa, and the United States. The project's mandate is to build the foundations for enhanced collaboration to improve understanding of the Atlantic Ocean and sustainably manage its resources. AtlantOS has been cited in G7 meetings as a potential best-practice model for a future global observatories initiative. The joint OECD/AtlantOS initiative will bring together economists, industry analysts, and public administrators, as well as social and natural scientists, to examine the economic potential of data from ocean observatories with the aim of better understanding where observatories lie in the value chain of the ocean economy. A first scoping workshop was held in June 2016, and a formal kickoff is planned for early 2017.

Data for "Appropriate" Policies

While we can expect a future global ocean observation initiative to collect data about the oceans, and we can reasonably expect to assess the added value of this data to the economy, a far more fundamental challenge is posed by the expectation that data should ultimately contribute to appropriate policies. At face value, the choice of language in the G7 communiqué reflects a widely-accepted view about the role of scientists in international relations, a view well summarized by Peter Haas. In his widely cited work on the role of knowledge-based communities ("epistemic communities," in his language) in intergovernmental decision making, Haas observed that "under conditions of complex interdependence and generalized uncertainty, specialists play a significant role in attenuating such uncertainty for decisionmakers. Policymaking leaders are typically in the dark about the sources of pollution, extent of contamination, interaction between emissions and water quality, the costs of clean-up, and the likely actions of their neighbors."17

The scientific community views this policy-related role as somewhat problematic. For example, a 2009 ocean observation strategy paper positions one of the community's goals as "foster[ing] an improved culture of public decision-making in climate and ocean issues based on impartial scientific data." However, it then adds that "advocacy (influencing national or global policies, laws or conventions) will not be a goal...although the data from sustained ocean observing systems will support this sort of policy development as a result of better ocean information being made available."18 The case for such ambiguity is perhaps not unfounded. While science is expected to reduce uncertainty, various science-policy studies have argued that good science doesn't necessarily lead to good policy. For example, one prominent scholar has argued that when "it comes to evidence-based policy, viewpoint matters. Whether wittingly or not, typical advice guides focus on the production side of scientific evidence and not on the use side. They tell us what counts as good science, not how to use that science to arrive at good policy."19 Even if uncertainty can be overcome by collecting a sufficient amount of high-quality data, societal debates about climate change or fish stocks, for example, have shown that the gap between good science and appropriate policies is not only difficult to bridge but also subject to varying interpretations. While the observing community may refer to "essential" data variables that need to be collected to characterize ocean functioning, the question for society is "For what purpose?" This question is particularly relevant considering that the oceans are a wildly contested space, where alongside any potential cooperation on environmental matters, states often have competing or even conflicting economic and security priorities.

Ocean Observatories as Tools for Science Diplomacy

Since at least the mid-nineteenth century, scholars have put forth the view that science can play a valuable role in shaping relations between states. Accompanying debates about exactly what institutional form that relationship can or ought to have similarly continue. The 2010 Royal Society/AAAS report on science diplomacy offers a simple yet very useful typology, arguing that three broad approaches exist to science diplomacy: informing foreign policy objectives with scientific advice (science in diplomacy); facilitating international science cooperation (diplomacy for science); and using science cooperation to improve relations between countries (science for diplomacy). Given that no policy-making process or institutional framework currently exists to govern the oceans, a global ocean observatory initiative could not initiative could not simply provide scientific advice for governance. This initiative is also not intended to facilitate intergovernmental relations to establish a scientific program. Instead, the proposed initiative would inaugurate a new form of international science cooperation. The scholarly challenge is that, to date, no research or policy analyses exist on the potential contributions of ocean observatories, as a practical scientific partnership, to inform intergovernmental cooperation. Thus, the aim within the scope of this short article can only be to raise a few questions and issues that might hopefully be addressed in more detail in the coming year or two.

Perhaps the the key question requiring a detailed answer in the near future is: What form of international cooperation would allow both science and policy communities to benefit from a global initiative that supports the better management, use, and protection of the oceans while maintaining its status as a science-based endeavor? While governments will expect an initiative to serve their agreed interests and scientists will want to serve their diverse academic interests, this question will require thoughtful consideration. Moreover, if the turbulent science, society and policy debates surrounding the negotiation, agreement, and implementation of climate-change targets are taken as an example, then a collaborative data collection effort to meet ocean targets exclusively aimed at improving marine environmental quality would have little chance of success.

By contrast, most states will expect to benefit from an expanded ocean economy and will not want to be seen as destroying the underlying natural capital from which this growth is derived. Given that ocean economic activity is expected to expand, in some areas perhaps faster than comparative land-based sectors, the aim according to OECD recommendations is to exploit ocean resources more sustainably and use its space more efficiently. To this end, a global ocean observatory could be pivotal in providing a knowledge basis upon which costs and benefits of different ocean uses can be weighed. Rather than simply providing advice, a G7-initiated ocean observatory might better be viewed as an initiative that encompasses both rigorous scientific activity to collect and publish data and information, as well as a

science-based venue for debate about the potential applications and implications of that data and knowledge.

Nothing in this article presumes or requires any a priori link between a particular set of data and a specific policy outcome. In themselves, data variables are little more than indicators selected by the scientific community to characterize the state of the oceans. However, the implications of choosing specific indicators and drawing conclusions from these could engender potentially powerful diplomatic tools that may shape interstate relations and, consequently, ocean governance. For this reason, an active process should be undertaken to debate data and their value for economic and policy analyses. If this approach were pursued, data from the oceans would constitute the beginning of a process of analysis and debate about the implications of that data, rather than the end of a process whereby the scientific community publishes data and disassociates itself from the ensuing debate on implications. Of course, such processes of analysis and debate should be managed within a scholarly institutional context, much as think tanks debate economic, energy, and foreign policies, to ensure it is decoupled from intergovernmental relations and, possibly, negotiations.

By framing efforts as a science-based discussion, a global ocean observation initiative might not only encourage policy to take available data into account when reflecting on the potential meaning of "appropriate" policies for the conservation and sustainable use of the oceans, but it may also strengthen the scientific community's reflection on which data are important for society. Certainly, much "boundary work" will need to be done to determine where the competencies of the observing community begin and end.20 The purpose of such work will be to ensure that the scientific community's findings are not taken to serve only the particular interests of one state or another. However, with careful management, the result might be an invaluable role for the scientific community in the better governance of ocean resources, notwithstanding the persistence of competing visions among states on what constitutes good ocean policy.

While an active dialogue with states will certainly pose challenges for the ocean science community and will have its skeptics, this has potential benefits. First, such an iterative approach is an ideal way of bridging the descriptive aspects and the normative implications of ocean data. If the scientific community managed such a process, it could contribute to promoting a science-based discussion from early on and, if successful, later contribute to science-based policies. Second, encouraging non-scientists to reflect on the benefits of a high-cost observatory might broaden societal awareness and acceptance of scientific knowledge by giving society a sense of "co-ownership" over such an initiative—much as many societies feel spaceflight is a worthy investment of public funds. In this way, the observing community could implement one of its guiding principles—namely, to create a broader understanding of ocean influences and to foster an improved culture of public decision-making in ocean issues.

At the same time, dialogue is aimed at more than just building momentum in the scientific community and encouraging public support. The concept of science diplomacy inherently also encompasses the need for interstate dialogue to overcome divergent and competing interests. Much as human spaceflight is characterized by interstate competition, so too is use of the oceans, where states seek to place flags as markers of their respective technological and economic achievements. Nowhere is this competition more evident than in areas beyond national jurisdiction. At least since the UN Convention on the Law of the Sea was agreed to by most states, intergovernmental diplomacy concerning the seas and oceans has focused on balancing between states' freedom and their duties to maintain peace and security as well as to cooperatively manage that space. Data and information are essential means for both exercising freedoms and managing cooperation. To date, ocean observing is seen as a mainly scientific-technical challenge with no significant political dimension. In the future, an intergovernmental ocean observing system would have a special role in internationalizing knowledge about the condition of the oceans. Thus, in order to answer the earlier-stated question about possible forms of international cooperation, further analysis is needed concerning state interests in gathering data and information for their competitive advantage and as a basis for collaboration.

As efforts continue to develop integrated ocean observing systems, the questions and issues raised in this article will need to be considered in more detail. The challenges of linking scientific collaboration with intergovernmental diplomacy are certainly enormous. However, the G7 states have initiated a process that offers a valuable test case on the conceptual and practical merits of science diplomacy in the management of international spaces beyond national jurisdiction. Specifically, this initiative could eventually yield knowledge on whether ocean observing systems could be useful means to promote cooperation and prevent conflict among states. For this reason alone, much time and effort should be invested by the scientific and policy communities in considering the variety of avenues that might lead to a successful initiative. **SD**

Endnotes

1. See William A. Nierenberg, "Roger Revelle," obituary,Physics Today 45 (1992): 119, doi: 10.1063/1.2809551.
2. For two recent examples, see Paul Snelgrove, "A Census of the Ocean," TEDGlobal 2011, https://www.ted.com/talks/paul_snelgrove_a_census_of_the_ocean/transcript?language=en - t-66000, and Editorial, "The Guardian View on Ocean Science: We Should Care More and Invest More," Guardian, August 7, 2015, https://www.theguardian.com/commentisfree/2015/aug/07/guardian-view-on-ocean-science-care-more-and-invest-more
3. Royal Society and AAAS, New Frontiers in Science Diplomacy (London: Royal Society, 2010), 18, https://www.aaas.org/sites/default/files/New_Frontiers.pdf
4. OECD,The Future of the Ocean Economy 2030 (Paris: OECD, 2016), 13, available at http://www.keepeek.com/Digital-Asset-Management/oecd/economics/the-ocean-economy-in-2030_9789264251724-en - .WEnQHXeZPUo
5. Woods Hole Oceanographic Institution, "Ocean Observatories," http://www.whoi.edu/main/ocean-observatories

6. See "About the OOI," http://education.oceanobservatories.org/about
7. See Rutgers University, "World's Richest Source of New In-Water Oceanographic Data Now Operational at Rutgers," Office of Research and Economic Development, https://ored.rutgers.edu/content/world's-richest-source-new-water-oceanographic-data-now-operational-rutgers; and Alexandra Witze, "Massive Ocean-Observing Project Launches—Despite Turmoil," Nature 534 (June 2016): 159–60, available at http://www.nature.com/news/massive-ocean-observing-project-launches-despite-turmoil-1.20031.
8. Alexandra Witze, "Oceanography's Billion-Dollar Baby," Nature 501 (September 2013): 480–82, available at http://www.nature.com/news/marine-science-oceanography-s-billion-dollar-baby-1.13803
9. National Research Council, Sea Change: 2015–2025 Decadal Survey of Ocean Sciences (Washington, DC: National Academies Press, 2015). See also Eli Kintisch, "Cut Hardware to Save Ocean Science, Says National Academies Panel," Science, January 23, 2015, http://www.sciencemag.org/news/2015/01/cut-hardware-save-ocean-science-says-national-academies-panel
10. G7 Science and Technology Ministers, Tsukuba Communiqué (May 2016), http://www8.cao.go.jp/cstp/english/index.html
11. CERN refers to the European Organization for Nuclear Research.
12. All references taken from the Tsukuba Communiqué.
13. Davor Vidas, "The Anthropocene and the International Law of the Sea," in "The Anthropocene: A New Epoch of Geological Time," ed. Mark Williams et al., themed issue, Philosophical Transactions: Mathematical, Physical and Engineering Sciences, vol. 369, no. 1938 (January 2011): 909, http://rsta.royalsocietypublishing.org/content/369/1938/909
14. Intergovernmental Oceanographic Commission, "Ocean Observations & Services," http://www.unesco.org/new/en/natural-sciences/ioc-oceans/sections-and-programmes/ocean-observations-services/
15. Task Team for an Integrated Framework for Sustained Ocean Observing, A Framework for Ocean Observing (Paris: UNESCO, 2012), 5.
16. World Wide Fund for Nature, Reviving the Ocean Economy: The Case for Action (Gland, Switzerland: WWF, 2015), http://assets.worldwildlife.org/publications/790/files/original/Reviving_Ocean_Economy_REPORT_low_res.pdf?1429717323&_ga=1.237838464.1224954937.1481238840, and OECD, The Future of the Ocean Economy.
17. Peter Haas, "Epistemic Communities and the Dynamics of International Environmental Cooperation," in Regime Theory and International Relations, ed. Volker Rittberger with Peter Mayer (Oxford: Oxford University Press, 1993), 188.
18. A Framework for Ocean Observing, 6.
19. Nancy Cartwright with Jacob Stegenga, "A Theory of Evidence for Evidence-Based Policy," in Evidence, Inference and Enquiry, ed. Philip Dawid, William Twining, and Mimi Vasilaki (London: British Academy, 2012), 290–91.
20. This term is taken from Thomas F. Gieryn, Cultural Boundaries of Science (Chicago: University of Chicago Press, 1999), 27.